

**CLAIMS**

- 1        1. A standoff/electrical device comprising:  
2                a standoff device to provide predetermined control of a standoff distance between electrical  
3 components mounted together with opposing conductive grid array patterns; and  
4                an electrical function structure to provide a predetermined electrical function to at least one  
5 of the electrical components.
- 1        2. A standoff/electrical device as claimed in Claim 1, where the standoff device arrangement  
2 comprises a plurality of rigid standoff pins having a mating relationship with at least one of the  
3 electrical components and a distancing control structure to control the standoff distance, with at least  
4 a sub-plurality of the plurality of rigid standoff pins having the electrical function structure to provide  
5 the electrical function.
- 1        3. A standoff/electrical device as claimed in Claim 2, where at least a portion of at least one pin  
2 of the plurality of rigid standoff pins has one of a dumbbell shape and a rolling-pin shape, and where  
3 protruding portions of the dumbbell shape and the rolling-pin shape serve to buttress against the  
4 electrical components to serve as the distancing control structure to control the standoff distance.
- 1        4. A standoff/electrical device as claimed in Claim 1, where the predetermined electrical  
2 function is at least one of: an electrical conduction path to provide an electrical conduction path  
3 between the electrical components; a resistor function; a capacitor function; and an inductor function.

1        5. A standoff/electrical device as claimed in Claim 1, where at least one of the electrical  
2 components is a printed circuit board (PCB), and where the conductive grid array patterns are at  
3 least one of: a bump/ball grid array (BGA); a micro BGA ( $\mu$ BGA), a land grid array; and a pad grid  
4 array.

1        6. A standoff/electrical device as claimed in Claim 1, where the standoff/electrical device is one  
2 of: composed substantially entirely of electrical-conductive material; and, constructed to have at  
3 least two differing areas composed of: electrical-conductive material; electrical-resistive material;  
4 electrical-insulative material; electrical-dielectric material; and electrical-inductor material.

1        7. A standoff/electrical device as claimed in Claim 1, where the standoff/electrical device is  
2 provided integrally as part of one of the electrical components.

1        8. A standoff/electrical device as claimed in Claim 1, where the standoff/electrical device  
2 comprises alignment structure to substantially align the opposing conductive grid-array patterns of  
3 the electrical components during mounting together thereof.

1        9. Mounted components comprising:  
2            at least two electrical components having opposing conductive grid-array patterns for  
3 electrical connection thereof; and

4 a standoff device to provide predetermined control of a standoff distance between electrical  
5 components mounted together with opposing conductive grid array patterns; and  
6 an electrical function structure to provide a predetermined electrical function to at least one  
7 of the electrical components.

1 10. Mounted components as claimed in Claim 9, where the standoff device comprises a plurality  
2 of rigid standoff pins having a mating relationship with at least one of the electrical components and  
3 a distancing control structure to control the standoff distance, with at least a sub-plurality of the  
4 plurality of rigid standoff pins having the electrical function structure to provide the electrical function.

1 11. Mounted components as claimed in Claim 10, where at least a portion of at least one pin of  
2 the plurality of rigid standoff pins has one of a dumbbell shape and a rolling-pin shape, and where  
3 protruding portions of the dumbbell shape and the rolling-pin shape serve to buttress against the  
4 electrical components to serve as the distancing control structure to control the standoff distance.

1 12. Mounted components as claimed in Claim 9, where the predetermined electrical function is  
2 at least one of: an electrical conduction path to provide an electrical conduction path between the  
3 electrical components; a resistor function; a capacitor function; and an inductor function.

1 13. Mounted components as claimed in Claim 9, where at least one of the electrical components  
2 is a printed circuit board (PCB), and where the conductive grid array patterns are at least one of: a  
3 bump/ball grid array (BGA); a micro BGA ( $\mu$ BGA), a land grid array; and a pad grid array.

1 14. Mounted components as claimed in Claim 9, where the electrical function structure is one of:  
2 composed substantially entirely of electrical-conductive material; and, constructed as at least two  
3 differing areas composed of: electrical-conductive material; electrical-resistive material; electrical-  
4 insulative material; electrical-dielectric material; and electrical-inductor material.

1 15. Mounted components as claimed in Claim 9, where the standoff device is provided integrally  
2 as part of one of the electrical components.

1 16. Mounted components as claimed in Claim 9, where the standoff device comprises aligner  
2 components to substantially align the opposing conductive grid-array patterns of the electrical  
3 components during mounting together thereof.

1 17. A components-mounting method comprising:  
2 mounting at least two electrical components having opposing conductive grid-array patterns  
3 for electrical connection thereof; and  
4 interposing a standoff device to provide predetermined control of a standoff distance  
5 between the at least two electrical components mounted together with opposing conductive grid

6 array patterns, and an electrical function structure to provide a predetermined electrical function to at  
7 least one of the electrical components.

1 18. A method as claimed in Claim 17, where the standoff device comprises a plurality of rigid  
2 standoff pins having a mating relationship with at least one of the electrical components and a  
3 distancing control structure to control the standoff distance, with at least a sub-plurality of the  
4 plurality of rigid standoff pins having the electrical function structure to provide the electrical function

1 19. A method as claimed in Claim 18, where at least a portion of at least one pin of the plurality  
2 of rigid standoff pins has one of a dumbbell shape and a rolling-pin shape, and where protruding  
3 portions of the dumbbell shape and the rolling-pin shape serve to buttress against the electrical  
4 components to serve as the distancing control structure to control the standoff distance.

1 20. A method as claimed in Claim 17, where the predetermined electrical function is at least one  
2 of: an electrical conduction path to provide an electrical conduction path between the electrical  
3 components; a resistor function; a capacitor function; and an inductor function.

1 21. A method as claimed in Claim 17, where at least one of the electrical components is a  
2 printed circuit board (PCB), and where the conductive grid array patterns are at least one of: a  
3 bump/ball grid array (BGA); a micro BGA ( $\mu$ BGA), a land grid array; and a pad grid array.

1 22. A method as claimed in Claim 17, where the standoff device is one of: composed  
2 substantially entirely of electrical-conductive material; and, constructed to have at least two differing  
3 areas composed of: electrical-conductive material; electrical-resistive material; electrical-insulative  
4 material; electrical-dielectric material; and electrical-inductor material.

1 23. A method as claimed in Claim 17, comprising providing the standoff device integrally as part  
2 of one of the electrical components.

1 24. A method as claimed in Claim 17, comprising providing the standoff device with alignment  
2 structure to substantially align the opposing conductive grid-array patterns of the electrical  
3 components during mounting together thereof.

1 25. A standoff/electrical device comprising a standoff member having a predetermined rigid  
2 standoff thickness and disposable between electrical components mounted together with opposing  
3 conductive grid array patterns so as to maintain a predetermined distance therebetween, the  
4 standoff member having an electrical path electrically connectable to at least one of the electrical  
5 components.

1 26. A standoff/electrical device as claimed in Claim 25, where the standoff member comprises a  
2 plurality of rigid standoff pins having a mating relationship with at least one of the electrical

3 components, with at least a sub-plurality of the plurality of rigid standoff pins having the electrical  
4 path.

1 27. A standoff/electrical device as claimed in Claim 26, where at least a portion of at least one  
2 pin of the plurality of rigid standoff pins has one of a dumbbell shape and a rolling-pin shape, and  
3 where protruding portions of the dumbbell shape and the rolling-pin shape serve to buttress against  
4 the electrical components to serve as the predetermined rigid standoff thickness to maintain the  
5 predetermined distance.

1 28. A standoff/electrical device as claimed in Claim 25, where the electrical path is at least one  
2 of: a substantially non-resistive electrical path; a resistive electrical path; a capacitive electrical path;  
3 and, an inductive electrical path.

1 29. A standoff/electrical device as claimed in Claim 25, where at least one of the electrical  
2 components is a printed circuit board (PCB), and where the conductive grid array patterns are at  
3 least one of: a bump/ball grid array (BGA); a micro BGA ( $\mu$ BGA), a land grid array; and a pad grid  
4 array.

1 30. A standoff/electrical device as claimed in Claim 25, where the standoff/electrical device is  
2 one of: composed substantially entirely of electrical-conductive material; and, constructed as at least

3 two differing areas composed of: electrical-conductive material; electrical-resistive material;  
4 electrical-insulative material; electrical-dielectric material; and electrical-inductive material.

1 31. A standoff/electrical device as claimed in Claim 25, where the standoff/electrical device is  
2 provided integrally as part of one of the electrical components.

1 32. A standoff/electrical device as claimed in Claim 25, where the standoff/electrical device  
2 comprises an first aligner of predetermined shape engageable with a second aligner on at least one  
3 of the electrical components so as to substantially align the opposing conductive grid-array patterns  
4 of the electrical components during mounting together thereof.

1 33. Mounted components comprising:  
2 at least two electrical components having opposing conductive grid-array patterns for  
3 electrical connection thereof; and  
4 a standoff/electrical device including a standoff member having a predetermined rigid  
5 standoff thickness and disposable between the at least two electrical components mounted together  
6 with the opposing conductive grid array patterns so as to maintain a predetermined distance  
7 therebetween, the standoff member having an electrical path electrically connectable to at least one  
8 of the at least two electrical components.



1 34. Mounted components as claimed in Claim 33, where the standoff member comprises a  
2 plurality of rigid standoff pins having a mating relationship with at least one of the at least two  
3 electrical components, with at least a sub-plurality of the plurality of rigid standoff pins having the  
4 electrical path.

1 35. Mounted components as claimed in Claim 34, where at least a portion of at least one pin of  
2 the plurality of rigid standoff pins has one of a dumbbell shape and a rolling-pin shape, and where  
3 protruding portions of the dumbbell shape and the rolling-pin shape serve to buttress against the at  
4 least two electrical components to serve as the predetermined rigid standoff thickness to maintain  
5 the predetermined distance.

1 36. Mounted components as claimed in Claim 33, where the electrical path is at least one of: a  
2 substantially non-resistive electrical path; a resistive electrical path; a capacitive electrical path; and,  
3 an inductive electrical path.

1 37. Mounted components as claimed in Claim 33, where at least one of the at least two  
2 electrical components is a printed circuit board (PCB), and where the conductive grid array patterns  
3 are at least one of: a bump/ball grid array (BGA); a micro BGA ( $\mu$ BGA), a land grid array; and a pad  
4 grid array.

1 38. Mounted components as claimed in Claim 33, where the standoff/electrical device is one of:  
2 composed substantially entirely of electrical-conductive material; and, constructed as at least two  
3 differing areas composed of: electrical-conductive material; electrical-resistive material; electrical-  
4 insulative material; electrical-dielectric material; and electrical-inductive material.

1 39. Mounted components as claimed in Claim 33, where the standoff/electrical device is  
2 provided integrally as part of one of the electrical components.

1 40. Mounted components as claimed in Claim 33, where the standoff/electrical device comprises  
2 a first aligner of predetermined shape engageable with a second aligner on at least one of the at  
3 least two electrical components so as to substantially align the opposing conductive grid-array  
4 patterns of the at least two electrical components during mounting together thereof.